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The method of comparing test results to the guaranteed performance should be discussed prior to the test. The actual method used depends on the turbine design and conditions of the contract.

II. I. Contract Conditions

II. I. 1. Tolerances

A manufacturer may consider guaranteeing better than expected performance a good business risk. During the first eighty years of the turbine business, purchasers only conducted ASME acceptance tests to determine if the turbine manufacturer met guarantee on about 10% of the units installed in the United States. Fuel was inexpensive and PTC 6 tests were very complex. This situation has changed. The cost of fuel has increased and the ASME PTC 6 Alternative Test has simplified the correction of the test heat rate to guarantee conditions. Since its conception in 1980, the Alternative Test is frequently used as an acceptance test. The Alternative Test is especially suited for determining the performance when a manufacturer replaces only one turbine section of another manufacturer's unit. However, when the turbine manufacturer fails to meet guarantee, the manufacturer may attempt to use statistics to show that the test did not prove the turbine was poorer than guarantee. This attempt is accomplished by using test uncertainty as tolerances. Applying tolerances to test results is completely unfair to the purchaser. Statistical uncertainties are calculated in such a way that the actual uncertainty is smaller than the calculated value 95% of the time. So, a turbine testing 1% poorer than guarantee with a testing uncertainty of $\pm 1\%$ is considered to meet guarantee by some manufacturers. Actually, in this example, the probability that the turbine met guarantee is $2\frac{1}{2}\%$. The probability that it is poorer than guarantee is $97\frac{1}{2}\%$. The most probable value is 1% poorer than guarantee. Therefore, the contract should clearly state that tolerances will not be applied to modify test results. That is, no tolerances for testing uncertainty and no tolerances for aging.

II. I. 2. Cost of Acceptance Tests

Another condition that is unfair to the purchaser is the additional cost associated with modifying the turbine design when the original design is poorer than guarantee. This cost is incurred from special outages, extended outages, more fuel burned because of the poor performance, and the cost of additional testing to measure the modified turbine performance. To correct this situation, the contract should state a realistic dollar value for heat rate deficiency over the life of the turbine that would be paid to the purchaser after the acceptance test or final payment withheld. The manufacturer would then be afforded the right to modify the turbine during scheduled outages. Under some circumstances, the modifications could be made at times when the unit is not needed to meet system demands. If the performance improved, the purchaser would pay back to the manufacturer at the same rate as the original settlement.